

2003 SPRING POPULATION SURVEYS OF GREATER SNOW GEESE IN THE ST. LAWRENCE VALLEY

SPRING POPULATION SURVEYS

The annual photographic survey of the Greater Snow Goose population on the spring staging grounds in the St. Lawrence Valley was continued in April and May 2003. A brief description of the standard methods is presented in Reed et al. (1998), and results from earlier years are given in Appendix I. As goose numbers increased and their geographic range expanded during the 1990s, it became increasingly difficult to confidently obtain complete coverage of the population. In response to this difficulty, an experimental project was initiated in 1998 using radio telemetry to assess the proportion of the population that might be missed during the survey. In the springs of 1998 to 2000, the regular survey crew searched for and photographed flocks as in past surveys, while another independent crew on board the same aircraft scanned those flocks for the presence of radio-marked geese; information on the presence/absence of radio-marked geese in these flocks was used to assess the proportion of the population missed during the survey. Details of the technique and of the statistical treatment of the data are given in Béchet et al. (in press). An evaluation of the technique, after three years, revealed that a very large number of radio-marked birds were required annually in order to obtain the desired level of precision ($\leq 10\%$). This approach has not, therefore, been used since 2000. Instead, modifications were made to the basic photographic survey based on recent knowledge about the spring migration pattern (Béchet et al. 2003). The most important modification was the use of three aircraft simultaneously in order to complete each of two surveys in a single day while at the same time increasing coverage of agricultural lands. Another minor but important modification was to ensure that the surveys were conducted at mid-day on warm, sunny days. These conditions tend to cause the geese to congregate in large flocks along the St. Lawrence River and other large water bodies where they are easily detected. Two surveys were conducted in 2003, the first on 30 April and the second on 11 May. As in past years, a few small flocks of geese were observed from the aircraft but could not be photographed; visual estimates of their numbers were added to the estimates obtained from the photo-counts.

Table 1: Results of the photographic surveys in April and May 2002; estimated numbers of geese from stratified sample counts of photographs, and confidence intervals. The confidence intervals relate only to the variance associated with sample counting.

	Estimated number of geese $\pm 95\%$ confidence intervals (A)	Precision	Number of geese observed in the survey area but not photographed (B)	Total number of geese A+B
Survey #1 30 April	625,124 \pm 48,569	7.8%	6,404	631,528
Survey # 2 11 May	674,388 \pm 55,241	8.2%	3,613	678,001

Following the standard approach from past years, the survey with the largest estimate (survey #2 in 2003) was retained as the most accurate. The estimate of 678,001 geese does not account for geese which escaped detection by the survey crews, however, we believe that the modifications made to the survey in 2001 reduced this problem. The 2003 estimate is 6% higher than the estimate for last year. However, the actual population size in 2002 may have been higher than the estimate of 639,276 geese because geese were widely distributed thereby increasing the chance of birds being missed. This does not appear to have been the case in 2003. And instead of an actual increase the population size is probably fairly similar to 2002's level.

**APPENDIX I: GREATER SNOW GOOSE POPULATION AND PRODUCTIVITY
ESTIMATES FROM THE ST. LAWRENCE VALLEY, 1965-2003**

Year	Estimated spring population ¹	Percent young in fall flight ²		Brood size ³ in fall	
		Mean	no. geese	mean	no. broods
1965	25400				
1966	25400				
1967	40900				
1968	38900				
1969	68800				
1970	89600				
1971	123300				
1972	134800				
1973	143000	40.6	800	2.94	49
1974	165000	6.4	7,282	2.19	119
1975	153800	31.2	17,579	2.71	1,294
1976	165600	12.6	20,847	2.46	419
1977	160000	23.9	10,297	2.28	396
1978	192600	17.9	9,679	2.34	309
1979	170100	28.2	20,849	2.65	1,226
1980	180000	35.3	12,120	2.76	651
1981	170800	16.3	10,683	2.30	229
1982	163000	25.1	9,577	2.48	661
1983	185000	47.4	12,353	2.86	1,246
1984	225400	30.4	39,781	2.63	2,434
1985	260000	25.8	33,700	2.49	1,682
1986	303500	2.3	22,998	1.89	74
1987	255000	40.2	33,278	2.77	1,882
1988	363800 ⁴	33.1	40,246	2.76	2,444
1989	363200	31.1	29,191	2.59	2,014
1990	368300	23.6	20,313	2.54	830
1991	352600	38.3	15,102	2.69	1,247
1992	448100	5.4	32,252	2.06	404
1993	498400	47.8	24,163	2.75	2,743
1994	591400	9.2	16,444	2.44	242
1995	616600	16.6	19,519	2.47	665
1996	669100	25.1	22,595	2.34	1,247
1997	657500	36.8	17,586	2.69	1,222
1998	(836600) ⁵ 741200	33.1	17,982	2.52	1,440
1999	(937850) ⁵ 803400	2.1	20,394	2.09	91
2000	(813900) ⁵ 577300	22.7	20,468	2.54	1,302
2001	837400	27.5	22,106	2.36	1,072
2002	639300	6.0	18,930	1.91	274
2003	678001				

¹ from aerial photo counts

² from visual ground counts

³ broods accompanied by 2 parents

⁴ no spring survey conducted - the value provided was derived from population model published in Gauvin & Reed (CWS Occas. Pap. No. 64. 1987)

⁵ the estimates in brackets for 1998 and 2000 have been corrected to account for flocks not observed during the survey, using data from a telemetry study (see text). The 1999 value is the mean of the correction factors used in 1998 and 2000.